National Institute of Environmental Health Sciences

Host, weather and virological factors drive norovirus epidemiology: Time-series analysis of laboratory surveillance data in England and Wales

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Abstract:

Norovirus, the most commonly identified cause of both sporadic cases and outbreaks of infectious diarrhoea in developed countries, exhibits a complex epidemiology and has a strong wintertime seasonality. Viral populations are dynamic and evolve under positive selection pressure. METHODS: Time series-adapted Poisson regression models were fitted to daily counts of laboratory reports of norovirus in England and Wales from 1993 to 2006. FINDINGS: Inverse linear associations with daily temperature over the previous seven weeks (rate ratio (RR) Euro Surveillance (Bulletin Europeen Sur Les Maladies Transmissibles; European Communicable Disease Bulletin) 0.85; 95% CI: 0.83 to 0.86 for every 1 degrees C increase) and relative humidity over the previous five weeks (RR Euro Surveillance (Bulletin Europeen Sur Les Maladies Transmissibles; European Communicable Disease Bulletin) 0.980; 95% CI: 0.973 to 0.987 for every 1% increase) were found, with temperature having a greater overall effect. The emergence of new norovirus variants (RR Euro Surveillance (Bulletin Europeen Sur Les Maladies Transmissibles; European Communicable Disease Bulletin) 1.16; 95% CI: 1.10 to 1.22) and low population immunity were also associated with heightened norovirus activity. Temperature and humidity, which may be localised, had highly consistent effects in each region of England and Wales. CONCLUSIONS: These results point to a complex interplay between host, viral and climatic factors driving norovirus epidemic patterns. Increases in norovirus are associated with cold, dry temperature, low population immunity and the emergence of novel genogroup 2 type 4 antigenic variants.

Source: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2726937

Resource Description

Early Warning System: ☑

resource focus on systems used to warn populations of high temperatures, extreme weather, or other elements of climate change to prevent harm to health

A focus of content

Exposure : ☑

weather or climate related pathway by which climate change affects health

Food/Water Quality, Meteorological Factors, Temperature

Food/Water Quality: Pathogen

☑

Geographic Feature: ☑

resource focuses on specific type of geography

None or Unspecified

Geographic Location: ☑

resource focuses on specific location

Non-United States

Non-United States: Europe

European Region/Country: European Country

Other European Country : England;Wales

Health Impact: ☑

specification of health effect or disease related to climate change exposure

Infectious Disease

Infectious Disease: Foodborne/Waterborne Disease

Foodborne/Waterborne Disease: Norovirus

Mitigation/Adaptation: ☑

mitigation or adaptation strategy is a focus of resource

Adaptation

Population of Concern: A focus of content

Population of Concern: ☑

populations at particular risk or vulnerability to climate change impacts

Children, Elderly, Low Socioeconomic Status

Resource Type: ☑

format or standard characteristic of resource

Research Article

Timescale: ☑

time period studied

Time Scale Unspecified

Vulnerability/Impact Assessment: ☑

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content